

Elevated Fall Rate and Fall Risk in Patients with Adult Spinal Deformity

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Introduction

Falls pose a major medical risk to our aging population. Annual fall rate for adults over the age of 65 is 13-20%, and 20% of those falls result in serious injury. Identification of modifiable risk factors is essential for developing fall prevention strategies. We currently know very little about the influence of adult spinal deformity (ASD) on fall risk.

Methods

Patients were retrospectively identified from outpatient records at a single institution. Inclusion criteria: coronal Cobb angle $>20^\circ$, sagittal vertical axis >5 cm, pelvic tilt $>25^\circ$, or thoracic kyphosis $>60^\circ$. Exclusion criteria: inability to walk/stand, neurodegenerative disease, spinal cord injury, or stroke. Fall risk and fall rate were determined based on the Morse Fall Scale (MFS). Demographic, radiographic, surgical, and HRQOL measures such as Short Form-36 (SF-36), Oswestry Disability Index (ODI), and Scoliosis Research Society (SRS-22) were collected. The relationship between fall risk, degree of spinal deformity and HRQOL was evaluated utilizing Pearson correlation and t-tests.

Results

A total of 71 patients with ASD were identified. Mean age was 59(+16), and 45 (63%) were female. Mean spinopelvic parameters were pelvic incidence 52+12, lumbar lordosis of 39+22, pelvic tilt (PT) of 24+11, sagittal vertical axis of 5.1+6.3cm, and thoracic kyphosis of 33+18.3. Self-reported fall incidence was 31% over 3 months, mean MFS fall risk was 33+22. Thoracic kyphosis was higher in patients with fall history (40.4+17.5 vs 29.5+17.8, $p=0.021$). MFS was positively correlated with PT (0.27, $p=0.026$). MFS was significantly associated with ODI ($p=0.003$), SF-36 PF ($p=0.021$), and SRS subdomains ($p<0.047$).

Conclusions

Based on our findings, incidence rate of falls in patients with ASD is elevated compared to published fall incidence rates among similar age groups. Patients with higher preoperative thoracic kyphosis and pelvic tilt appear to be at elevated risk of falls, and their MFS-based fall risk is strongly associated with multiple HRQOL measures.

Learning Objectives

Fall incidence and risk are important elements to consider in evaluating patients with spinal deformity, as they may be at elevated risk compared to the normal population.

Fall risk in Adult spinal deformity appears to be strongly associated with thoracic kyphosis and pelvic tilt, and is strongly associated with subjective health outcomes.

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